

REMARKS

Response to §103 Rejections of Claims 1-6 and 8-16

In the August 24, 2005 Office Action, the Examiner rejected claims 1-6 and 8-16 under 35 U.S.C. §103(a) for alleged obvious over U.S. Patent No. 6,893,955 to Lopatin et al. (hereinafter "Lopatin") in view of U.S. Patent Application Publication No. 2003/0017635 to Apen et al. (hereinafter "Apen").

Applicants respectfully reverse the Examiner's rejections of claims 1-6 and 8-16, for the following reasons:

Claim 1, from which claims 2-6 and 8-16 depend, positively recites "a buried etch stop layer comprised of a polymeric material having a composition $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$, where $0.05 \leq v \leq 0.8$, $0 \leq w \leq 0.9$, $0.05 \leq x \leq 0.8$, $0 \leq y \leq 0.3$, $0.05 \leq z \leq 0.8$ for $v+w+x+y+z=1$."

The primary reference Lopatin discloses a buried etch stop layer 222, but it fails to teach or suggest in any manner that the buried etch stop layer 222 is comprised of a polymeric material having the specific composition recited by claims 1-6 and 8-16 of the present application.

In the August 24, 2005 Office Action, the Examiner expressly conceded the deficiency of Lopatin, but still attempted to remedy such a deficiency by citing the secondary reference Apen and asserting that Apen discloses forming an etch stop of polycarbosilane in paragraph [0025] (see the Office Action, page 3, lines 5-8).

Applicants rigorously disagree with the Examiner's assertion.

Apen discloses in paragraph [0025] that "a low dielectric constant polyorganosilicon coating, material, or film that... demonstrates good adhesion to adjacent layers and surfaces upon which the material is coated, including... etchstop layers."

Clearly, Apen discloses use of the low dielectric constant polyorganosilicone in forming a coating layer over etch stop layers, but not forming an etch stop layer. In fact, nothing in Apen

teaches or suggests that the low dielectric constant polyorganosilicone can be used to form an etchstop layer itself.

Therefore, the Examiner's assertion that Apen discloses forming an etch stop of polycarbosilane in paragraph [0025] is an improper misinterpretation of paragraph [0025] of the Apen reference.

Combination of the Lopatin and Apen based on the proper interpretation of the Apen reference, i.e., as disclosing the use of the low dielectric constant polyorganosilicone in forming a coating over an etchstop layer, would yield an interconnect structure that comprises, from bottom to top: a via level interlayer dielectric, a buried etch stop layer, a low dielectric constant polyorganosilicon coating over the buried etch stop layer, and a line level interlayer dielectric over the polyorganosilicon coating.

Such an interconnect structure derived from the combination of Lopatin and Apen, however, still does not contain a buried etch stop layer that is "comprised of a polymeric material having a composition $\text{Si}_v\text{N}_w\text{C}_x\text{O}_y\text{H}_z$, where $0.05 \leq v \leq 0.8$, $0 \leq w \leq 0.9$, $0.05 \leq x \leq 0.8$, $0 \leq y \leq 0.3$, $0.05 \leq z \leq 0.8$ for $v+w+x+y+z=1$," as positively recited by claims 1-6 and 8-16 of the present application. Further, such an interconnect structure fails to contain a line level interconnect dielectric "that is directly above said buried etch stop layer," as positively recited by claims 1-6 and 8-16 of the present application.

Therefore, claims 1-6 and 8-16 of the present application patentably distinguish over the combination of the Lopatin and Apen references.

Response to §103 Rejections of Claim 7

In the August 24, 2005 Office Action, the Examiner rejected claim 7 under 35 U.S.C. §103(a) for alleged obvious over Lopatin in view of Apen and further in view of U.S. Patent

Application Publication No. 2005/0124153 to Cohen (hereinafter "Cohen").

Claim 7 depends directly from claim 1 and therefore patentably distinguishes over the combination of Lopatin and Apen, for the same reasons as explained hereinabove for claim 1.

Cohen discloses an adhesion layer 18 formed on an exposed inner surfaces of a via (Cohen, Figure 1 and paragraph [0025]). Nothing in Cohen teaches or suggests formation of a buried etch stop layer, much less a buried etch stop layer comprised of a polymeric material having the composition as recited by claim 1 from which claim 7 depends.

Therefore, Cohen cannot remedy the deficiency of Lopatin and Apen, and claim 7 thus patentably distinguishes over the combination of Lopatin, Apen, and Cohen.

Response to Obviousness-Type Double Patenting Rejections of Claims 1-16

In the August 24, 2005 Office Action, the Examiner further rejected claims 1-16 under the judicially created doctrine of obviousness-type double patenting as alleged unpatentable over claims 7-8 of U.S. Patent No. 6,803,660 (hereinafter "the '660 Patent").

In response, a terminal disclaimer in compliance with 37 CFR 1.321(c) is filed herewith, which overcomes the obviousness-type double patenting rejection.

Based on the foregoing, Applicants correspondingly request the Examiner to reconsider, and upon reconsideration to withdraw, the rejections of claims 1-16.

CONCLUSION

Claims 1-16 of the present application are in condition for allowance. Issue of a Notice of Allowance for the application is therefore requested.

If any issues remain outstanding, incident to the formal allowance of the application, the Examiner is requested to contact the undersigned attorney at (516) 742-4343 to discuss same, in order that this application may be allowed and passed to issue at an early date.

Respectfully submitted,



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